

Claims

What is claimed is:

- 5 1. An image scanning assembly for scanning an image of an object, comprising:
an optical shutter assembly including a plurality of individually actuateable shutter elements
for substantially allowing or blocking transmission of light wherein at least a portion
of the light is one of reflected from and transmitted through the object through said
optical shutter assembly;
- 10 an optical sensor for sensing light reflected from or transmitted through the object through
said optical shutter assembly;
wherein selected ones of said plurality of shutter elements are actuated in a predetermined
sequence for allowing light reflected from or transmitted through the object to pass
though the optical shutter assembly whereupon the light is sensed by said optical
15 sensor.
2. The image scanning assembly as claimed in claim 1, further comprising a
light source for emitting light for illuminating the object.
3. The image scanning assembly as claimed in claim 2, wherein said light source
20 comprises a strobe light source for generating high intensity pulses of light.
4. The image scanning assembly as claimed in claim 1, further comprising a
backlighting light source for transmitting light through the object.
- 25 5. The image scanning assembly as claimed in claim 1, further comprising a
light guide assembly for at least one of conducting light to said optical shutter assembly and
conducting light reflected from or transmitted through the object to said optical sensor.
6. The image scanning assembly as claimed in claim 5, wherein said light guide

assembly comprises a plurality of light conducting columns for conducting light along an axis of the image scanning assembly.

7. The image scanning assembly as claimed in claim 6, further comprising a
5 light source for generating high intensity pulses of light, each of said plurality of light conducting columns including a color adjustment assembly for adjusting the color of said pulses of light conducted by said light conducting column.

8. The image scanning assembly as claimed in claim 6, further comprising a
10 strobe light source for generating high intensity pulses of light, each of said plurality of light conducting columns including a color filter for filtering pulses of light emitted by said light source into at least one color and a shutter element for selecting the color of said pulses of light conducted by said conducting columns.

9. The image scanning assembly as claimed in claim 8, wherein each of said
15 color filter elements comprises red, blue, and green filters for providing the red, blue and green light.

10. The image scanning assembly as claimed in claim 9, wherein said color filter comprises a liquid crystal shutter element for adjusting the proportion of light passing through said red, green and blue filters.

11. The image scanning assembly as claimed in claim 9, wherein each of said
20 light conducting columns further comprises a diffuser for diffusing, randomizing and mixing light passing through said liquid crystal shutter element.

13. The image scanning assembly as claimed in claim 6, wherein each of said light conducting columns further comprises a polarizer.

25 14. The image scanning assembly as claimed in claim 6, further comprising a

polarizing layer disposed between said plurality of light conducting columns and said plurality of shutter elements.

15. The image scanning assembly as claimed in claim 1, wherein each of said
5 plurality of shutter elements comprises an elongated liquid crystal shutter row.

16. An image scanning assembly for scanning an image of an object, comprising:
a light source for backlighting the object so that light is at least partially transmitted through
the object;
10 an optical shutter assembly including a plurality of individually actuateable shutter elements
for substantially allowing or blocking light transmitted through the object from said
light source through said optical shutter assembly;
a plurality optical sensors for sensing light transmitted through the object and said optical
shutter assembly;
15 a light guide assembly for conducting light transmitted through the object and said optical
shutter assembly to said optical sensor,
wherein selected ones of said plurality of shutter elements are actuated in a predetermined
sequence for allowing light transmitted through the object to pass through the optical
shutter assembly whereupon the light is sensed by said plurality of optical sensors.
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17. The image scanning assembly as claimed in claim 16, wherein said light
guide assembly comprises a plurality of light conducting columns for conducting light along
an axis of the image scanning assembly from said optical shutter assembly to said plurality
of optical sensors.

18. The image scanning assembly as claimed in claim 16, wherein each of said
25 plurality of shutter elements of said shutter assembly comprises an elongated liquid crystal
shutter row.

19. The image scanning assembly as claimed in claim 16, wherein said optical

sensor comprises a color image sensor having red, blue and green sensing elements for sensing red, blue and green light.

20. The image scanning assembly as claimed in claim 16, further comprising a
5 color filter assembly for filtering light transmitted by said optical shutter assembly into at least one color.

21. The image scanning assembly as claimed in claim 20, wherein said color filter
assembly comprises red, blue, and green color filters.
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22. An image scanning assembly for scanning an image of an object, comprising:
an optical shutter assembly including a plurality of individually actuateable means for
substantially allowing or blocking transmission of light wherein at least a portion of
the light is one of reflected from and transmitted through the object through said
15 optical shutter assembly;
means for sensing light reflected from or transmitted through the object through said optical
shutter assembly;
wherein selected ones of said plurality of means for allowing or blocking transmission of
light are actuated in a predetermined sequence for allowing light reflected from or
20 transmitted through the object to pass through the optical shutter assembly whereupon
the light is sensed by said sensing means.

23. The image scanning assembly as claimed in claim 22, further comprising a
means for emitting light for illuminating the object.

24. The image scanning assembly as claimed in claim 22, further comprising a
25 means for transmitting light through the object.

25. The image scanning assembly as claimed in claim 22, further comprising
means for conducting light reflected from or transmitted through the object to said sensing

means.